APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/500,181	02/07/2000	Alexander Berestov	3716(CFP1047US)	2223

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EXAMINER
PATEL, SHEFALI D

ART UNIT	PAPER NUMBER
2621	

DATE MAILED: 01/15/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 07-01)

	Application No.	Applicant(s)
Office Action Summary	09/500,181	BERESTOV, ALEXANDER
	Examiner	Art Unit
	Shefali d Patel	2621

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>02/26/2001</u> .

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☐ Claim(s) _____ is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1-19</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>26 February 2001</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

    If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____ .

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

    a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>2+3</u> .

4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: .

DETAILED ACTION

Specification

1.   The disclosure is objected to because of the following informalities:

a.   On page 5 paragraph [0012], the last word in line 1 "the" ought to be replaced

with "that".

b.   On page 8 paragraph [0025], second to the last line mentions "1A,ab". This ought

to be replaced with "1A, 1B" according to the content of the specification and Figure 1.

c.   On page 15 paragraph [0042] line 5 uses two prepositions "a" and "the" in

"...with a the first true value to...". Please omit either "a" or "the."

Appropriate correction is required.

2.   Claims10-12 are objected to because of the following informalities:

a.   Claim 10 line 9 uses two prepositions "a" and "the" in "...match points that

correspond to a the point...". Please omit either "a" or "the."

b.   Claims 11 and 12 depend from claim 10.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

3.   The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making
and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it

pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4.   Claims 10-12 are is rejected under 35 U.S.C. 112, first paragraph, as containing subject

matter which was not described in the specification in such a way as to reasonably convey to one

skilled in the relevant art that the inventor(s), at the time the application was filed, had

possession of the claimed invention. Claim 10 recites the limitation "a camera shift value" in

line 3 of claim 10. Shifting a camera value is never mentioned in the specification. Claims 11

and 12 are subject to the same rejection for depending from claim 10.

Drawings

5.   The corrected or substitute drawings were received on 02/26/2001. These drawings are

acceptable.

6.   The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they

do not include the following reference sign(s) mentioned in the description:

        Page 16 line 1 and line 3 mentions of element 600 to be included in Figure 7. However,

Figure 7A or 7B lacks of element 600.

A proposed drawing correction or corrected drawings are required in reply to the Office action to

avoid abandonment of the application. The objection to the drawings will not be held in

abeyance.

Claim Rejections - 35 USC § 103

7.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

8.   Claims 1-5 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Gerstenberger (USPN 5,220,441).

With regards to **claim 1** which is representative of **claim 18**, Gerstenberger discloses a

method for locating matching points in two images of a scene, a left image (image 22, Fig. 4)

and a right image (image 21, Fig. 4) such that the images have at least some overlap area (note

that Gerstenberger determines parallax between two images, hence these two images do overlap).

Gerstenberger discloses a method that selects a first point within the overlap area in the right

image (point 25 in image 21, Fig. 4). Also, running a first correspondence search using the first

point to find a first matching point in the left image (point 26 in image 22, Fig. 4). Further,

Gerstenberger discloses a method running a second correspondence search on the first matching

point (point 25 in image 21, Fig. 4) to find a second matching point in the right image.

Gerstenberger's invention searches the second corresponding search to the left of first matching

point. Applicant is claiming for the second corresponding search to the right of the first

matching point. The choice of direction is common and hence it would have been obvious to a

person of ordinary skill in the art to not search any points to the left of the first point in the right

image to find the edge of the overlapped region of two stereo images. Knowing the left

boundary of the right image in the overlap region, one is motivated to search to the right of the

first point to find the boundary (edge) of the left image. This way, overlapped region is obtained.

Gerstenberger discloses a method selecting a match point comprising the first matching

point and second matching point at column 10 lines 43-50. Note that the match point is selected

after evaluating the search window (SW) and corresponding window (CW).

Claim 18 includes an additional element of storage device in its system, which is

disclosed in Gerstenberger's invention at column 6 lines 11-15 and also shown at element 100 in

Figure 2.

With regard to **claim 2** Gerstenberger discloses a method where the step of selecting a

match point comprising selecting only those match points in which the second matching point is

same as the first matching point at column 7 lines 52-60.

With regard to **claim 3,** Gerstenberger discloses a method where the step of running the

first correspondence search comprises running a classic stereo correspondence search at column

6 lines 11-17.

With regard to **claim 4,** Gerstenberger discloses a method where the second

correspondence search uses a different matching algorithm than the algorithm used in the first

correspondence search at column 9 lines 44-53. Second correspondence search is run by

identifying location of the tie points, where the first correspondence search is determined using

the boundary windows.

With regard to **claim 5,** Gerstenberger discloses a method where the step of running the

first correspondence search comprises running a correlation-based matching algorithm at column

8 lines 35-41. Note that the correlation-based matching algorithm is used throughout the

Gerstenberger's invention.

9.   Claims 6-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gerstenberger,

as applied to claim 1 above, in view of Onda (USPN 5,867,591).

With regards to **claims 6 and 7,** Onda discloses a method where the step of running the

first correspondence search comprises running a feature-based matching algorithm (column 12

lines 25-30) and a phase-based matching algorithm (column 10 lines 13-28), respectively.

One of ordinary skill in the art would have been motivated to use the feature and phase based

matching algorithm of Onda in order to evaluate the corresponding points of the edges that

comes in contact when two images are overlapped.

10.   Claims 8, 13-17 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Gerstenberger in view of Onda as applied to claims 1-7 above, and further in view of Chen et al.

(USPN 5,917,962).

With regards to **claim 8,** Gerstenberger discloses all the elements that are included in

claim 8 (note that these elements are same as those in claim 1) and Gerstenberger discloses

storing each selected match point in a list of match points (column 15 lines 19-20).

Gerstenberger does not disclose the following elements in claim 8. Gerstenberger does not

expressly disclose splitting the left and the right image into left and right subimages wherein

each subimage comprises the values of only one of the color coordinates used to define the

image with which it is associated. Gerstenberger also does not disclose pairing each left and

right subimages, which uses the same color coordinate values. Onda discloses a method in

matching stereo images where the two images, left and right, are split in left and right subimages

(column 11 lines 9-14). Chen et al. discloses method of partitioning an image where the

subimages comprises the values of only one of the color coordinates used to define the image

with which its associated (Figure 4 and it's respective section in specification). Chen et al.

teaches the concept of subimages evaluating on a pixel-by-pixel (column 1 lines 13-25) and it is

also well known in the art.

At the time the invention was made, it would have been obvious to a person of ordinary

skill in the art to split the image into subimages and evaluate each subimages depending on the

color coordinate value and to pair each subimages that uses the same color coordinate values.

By doing this, one can decrease the memory requirement associated with color data to provide

more efficient transmission and storage of the image.

With regards to **claims 13-15**, the recited features are the same as those in claims 3-5, and

the arguments in paragraph 8 above as to the relevance of Gerstenberger are incorporated herein.

With regards to **claims 16-17**, the recited features are the same as those in claims 6-7, and

the arguments in paragraph 9 above as to the relevance of Gerstenberger and Onda are

incorporated herein.

With regards to **claim 19**, both Gerstenberger and Chen et al. discloses a computer-

readable medium in Figure 2 and Figure 1, respectively. The recited features are the same as

those in claim 8, and the arguments in paragraph 10 above as to the relevance of Gerstenberger,

Onda, and Chen et al. are incorporated herein.

11.   Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gerstenberger in

view of Onda in view of Chen et al. as applied to claim 8 above, and further in view of Prazdny

(USPN 4,745,562).

Regarding to **claim 9,** Prazdny discloses a method of comparing the matching points

stored in the list of match points that correspond to the given point across each subimage pair

(column 8 lines 36-41) and responsive to the matching points in the list of matching points being

different for each subimage pair (column 9 lines 3-17), removing the matching point from the list

of match points (column 10 lines 28-39, note that finding the best "allowable matches within a

window" the matching point is determined).

At the time the invention was made, it would have been obvious to a person of ordinary

skill in the art to combine the invention of Prazdnv (finding, comparing and removing the

matching points from the list (or table)) with the inventions of Gerstenberger, Onda and Chen et

al. One can expedite the process by using the list of stored matching points to compare each

pixel of subimages.

Allowable Subject Matter

12.   Claims 10-12 are objected to as being dependent upon a rejected base claim, but would

be allowable if rewritten in independent form including all of the limitations of the base claim

and any intervening claims.

13.   Claim 10-12 would be allowable if rewritten to overcome the rejection(s) under 35

U.S.C. 112, first paragraph, set forth in this Office action and to include all of the limitations of

the base claim and any intervening claims.

Conclusion

14.   The prior art made of record and not relied upon is considered pertinent to applicant's

disclosure.

USPN 6028954, Tomita et al. discloses a method and apparatus for three-dimensional

position measurement.

USPN 6128416, Oura discloses image composing technique for optimally composing a

single image from a plurality of digital images.

USPN 5202928 Tomita et al. discloses surface generation method from boundaries of

stereo images.

USPN 6005987 Nakamura et al. discloses picture image forming apparatus.

USPN 6078701 Hsu et al. discloses method and apparatus for performing local to global

multiframe alignment to construct mosaic images.

USPN 5818959 Webb et al. discloses method of producing a three-dimensional image

from tow-dimensional images.

USPN 5727078 Chupeau discloses process for estimating disparity between the

monoscopic images making up a stereoscopic image.

USPN 4825393 Nishiya discloses position measuring method.

USPN 6141440 Melen discloses disparity measurement with variably sized interrogation regions.

USPN 5768404 Morimura et al. discloses motion and disparity estimation method, image synthesis method, and apparatus for implementing same methods.

JP409251538A Oshima discloses a device and method for judging presence or absence of object.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shefali d Patel whose telephone number is 703-306-4182. The examiner can normally be reached on M-F; 8:00am - 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo Boudreau can be reached on 703-305-4706. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9314 for regular communications and 703-872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-306-0377.

Shefali Patel
December 31, 2002
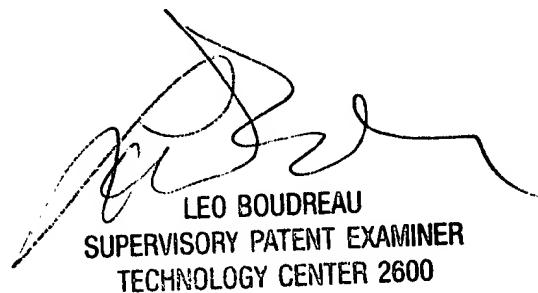
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